REMARKS

Applicants respectfully request reconsideration an allowance of the above-identified patent application. By this amendment, claims 1-27 and 45-55 remain pending, wherein claims 1-17, 27, 45, and 55 have been amended and claims 28-44 and 56-57 have been canceled. Of the pending claims the independent claims include the series of computer programs of claim 1, and the methods of claim 17 and 45.

Initially, Applicants and Applicants' attorney express appreciation to the Examiner for the courtesies extended during the telephonic interview held on October 31, 2006. The amendments and following arguments submitted in this paper are substantially consistent with those presented during the course of the interview.

The Office action rejects the independent claims under 35 U.S.C. § 102(e) as allegedly being anticipated by U.S. Patent No. 6,738,971 to Chandrasekaran et al. ("'971"). The Office action rejected the remaining dependent claims under either 35 U.S.C. § 102(e) as allegedly being anticipated by '971 or under 35 U.S.C. § 103(a) as allegedly being unpatentable over '971 in view of U.S. Patent Application Publication No. 2003/0200467 to Choy et al. ("'467"). Applicants respectfully traverse these grounds of rejection.

The present invention is generally directed to methods and computer program products for providing a two-phase commit protocol for transactions that occur across a plurality of databases within a volume. In the past the system volume used a single distributed transaction coordinator to ensure the integrity of the system such that changes to the system either commit or fail as a whole. This volume-level management, however, at times prevents multiple databases and other entities from operating completely independently. Thus, if one database in the volume fails to recover, the entire transactional file system volume may be unrecoverable, which may yet

render any other databases using the files system unrecoverable as well. In addition, as the sizes of volumes and the number of users and applications sharing a volume continue to grow, the model described above in which actions taken with respect to one entity adversely affect the actions of another entity becomes unworkable.

Accordingly, embodiments herein rectify the deficiencies of the past by providing multiple independent transactional resource managers on a single logical volume, such that each resource manager becomes a unit of storage management defined by the scope of files or resources for which it is responsible. More specifically, embodiments provide each resource manager independently maintains a set of transactional metadata used to guarantee transactional metadata associated with the resources or collection of files that are contained within its scope. For example, the transactional metadata used to guarantee transactional consistency such as a log file, along with files used in a transaction, may comprise the set of resources within the scope of control of a resource manager. The resource manager is thus defined by the collection of files for which it is responsible. For example, the scope may be defined based on such things as a directory hierarchy, a file type, file extension, timestamp within a common time frame, by file size, a tag stored within a file, etc.

Claim 1 is directed toward some of the embodiments mentioned above and recites in a distributed computing environment that typically uses a single distributed transaction coordinator to monitor changes to files on a per logical system volume basis, a series of computer programs with computer executable instructions within one or more computer storage medium used to provide a plurality of independent resource managers that operate with respect to transactions, thereby acting as separate units within the volume in order to ensure that operations to one database within the volume do not affect operations of other databases or users of the volume.

The series of computer programs comprises: (1) a logical volume of a file system that includes a plurality of resources among a distributed system, wherein one or more of the plurality of resources includes a resource manager, which is an object that participates in a transaction and provides a subsystem that implements a transaction-protected resource; and (2) a plurality of resource managers maintained on the file system volume, each resource manager independent from one another and having associated transactional metadata and a collection of associated files, wherein the transactional metadata is maintained based on a scope of control set for each of the plurality of resource managers by defining a collection of files or resources based on one or more of a directory hierarchy, a file extension, a file type, a timestamp, a file size, or a tag within the files for which the particular resource manager is responsible in order to allow various options offering different levels of performance, reliability, feature availability, and manageability on a per-resource basis rather than a per volume basis.

Applicants respectfully submit that the combination of '971 and '467 does not render the current claim 1 unpatentable for at least the reason that the cited prior art—either taken individually or as a whole—does not disclose or suggest each and every element of the independent claims. For example, the cited '971 and '467 references do not disclosed or suggest a plurality of resource managers maintained on the file system volume, each resource manager independent from one another and having associated transactional metadata and a collection of associated files, wherein the transactional metadata is maintained based on a scope of control set for each of the plurality of resource managers by defining a collection of files or resources based on one or more of a directory hierarchy, a file extension, a file type, a timestamp, a file size, or a tag within the files for which the particular resource manager is responsible in order to allow

various options offering different levels of performance, reliability, feature availability, and manageability on a per-resource basis rather than a per volume basis.

The '971 patent discloses using a resource manager to coordinate the committing of a distributed transaction. As discussed and generally agreed to during the interview, the background section of the '971 document discusses "commit latency" problems of the past single transactional coordinator described above. (*See e.g.*, col. 1, l. 24 through col. 3, l. 50). As one solution to such latency issues, the '971 patent then describes a system where the transactional coordinator can pass the responsibility of ensuring the two-phase commit sequence to one of the database systems that itself is currently committing changes for the distributed transaction. (*See e.g.*, col. 3, l. 51 through col. 4, l. 32). In other words, one random database involved in the transactions acts as the temporary commit coordinator for ensuring that other databases involved in the transaction commit, otherwise the temporary commit coordinator instructs all databases in the transaction to roll back to a previous state. Note, however, that unlike the present invention, this temporary commit coordinator is still a single coordinator acting on a per volume basis, rather than a per resource basis.

In the remaining part of the background section, the '971 reference then describes the reasons why in certain circumstances even the temporary commit coordinator causes commit latencies. In order to overcome the commit latency of the prior art, the '971 modifies the above temporary commit coordinator by providing databases with resource managers that can be used to act as a temporary commit coordinator. Rather than randomly selecting the temporary commit coordinator; the '971 chooses the appropriate resource manager to act as the committing coordinator based on such things as a resource manager that is believed to have the most number of changes that need to be committed, a database system identified as a default committing

coordinator, etc. In other words, similar to the prior art described in the background section of the '971 patent, the '971 document simply chooses a resource manager to act as a temporary commit coordinator on a per volume basis—the difference being that the '971 reference makes a more informed decision about which database to choose .

The '971 cited reference, however, is silent with regard to defining the scope of control of a resource manager based on transactions, rather than on a per volume basis. As such, the '971 patent cannot possibly disclose or suggest maintaining transactional metadata based on a scope of control set for a particular resource manager by defining a collection of files or resources based on one or more of a directory hierarchy, a file extension, a file type, a timestamp, a file size, or a tag within the files for which the particular resource manager is responsible, as recited in claim 1. In fact, since the '971 document attempts to solve a different problem of the prior art with a different solution than the current claimed invention (i.e., solving the "commit latency" issue by selectively determining what resource manager should act as a temporary commit coordinator; rather than solving the problem associated with per volume basis resource managers by defining the scope of a resource manager based on files or resources for which it's responsible, as presently claimed), Applicants respectfully submit that the '971 patent actually "teaches away" from Applicants' claimed invention.

Recognizing some of the deficiencies of '971 the Office action cites the '467 publication. The '467 reference discloses a system and method for incremental refresh of a compiled access control table in a content management system. Like the '971 patent, the '467 application is silent with regards to defining the scope of a resource manager based on files or resources for which it's responsible; and therefore, the '467 document cannot possibly rectify those deficiencies

noted above with regard to the '971 reference. Accordingly, Applicants respectfully submit that the combination of '971 with '467 does not render Applicants' claim 1 unpatentable.

The other independent claims 17 and 45 recite methods with similar elements as those argued above with regard to claim 1. As such, these independent claims are also patentably distinguishable over the '971 with '467 cited references for at least those reasons stated above with regard to claim 1.

Based on at least the foregoing reasons, Applicants respectfully submit that the cited prior art fails to anticipate or otherwise make obvious Applicants' invention as claimed for example, in independent claims 1, 17, and 45. Applicants note for the record that the remarks above render the remaining rejections of record for the independent and dependent claims moot, and thus addressing individual rejections or assertions with respect to the teachings of the cited art is unnecessary at the present time, but may be undertaken in the future if necessary or desirable and Applicants reserve the right to do so.

All objections and rejections having been addressed, Applicants respectfully submit that the present application is in condition for allowance, and notice to this effect is earnestly solicited. Should any questions arise in conjunction with this application or should the Examiner believe that a telephone conference with the undersigned would be helpful in resolving any remaining issues pertaining to this application, the undersigned respectfully requests that he be contacted at 1-801-533-9800.

DATED this 15th day of December, 2006.

Respectfully Submitted,

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